Cruise Report
U.S. Geological Survey Research Cruise 2016-673-FA
Santa Barbara Littoral Cell, California
September 26-30, 2016

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USGS

Summary

From September 26 to 30, 2016, the Pacific Coastal and Marine Science Center of the U.S Geological Survey (USGS) conducted single-beam bathymetric surveys in the nearshore waters of the Santa Barbara Littoral Cell (Figure 1). The work was conducted using one Coastal Profiling System (CPS) (personal watercraft outfitted with custom GPS and echosounder survey equipment) to survey the inshore ends of lines, and a small boat outfitted with the same equipment to survey the offshore ends. Watercraft were launched out of Santa Barbara, Ventura and Channel Islands Harbors. The survey was the seventeenth in a series of surveys in this area, starting in October 2005.

The shoreline of the Santa Barbara Littoral cell consists of a diverse assemblage of sandy, rocky and armored segments with a variety of exposures to waves and currents due to differing degrees of sheltering by offshore islands and nearshore reefs. There are two major river systems (Ventura and Santa Clara) that provide highly variable inputs of terrestrial sediment into the littoral cell. The Santa Clara River is particularly noteworthy as it is the largest source of sediment to southern California nearshore waters. Alongshore transport is driven by wave activity and primarily is from NW to SE, with nearshore sediments ultimately feeding into Mugu Canyon at the southern end of the littoral cell. There is significant development along much of the coastline. Surveys in this region are designed to document coastal evolution on a variety of timescales, from large surf and flood events, to seasonal and decadal, to improve our understanding of the coastal processes that affect shoreline erosion and accretion. Data from these surveys are being used in models of coastal change, including future conditions that include sea level rise and climate change, and to support management of existing coastal resources.

It was determined that the operating frequency of the sonar system (200 kHz) is above the cutoff hearing threshold for marine mammals, therefore the CSLC determined that the observance of a safety zone is not a requirement for this survey (personal communications, K. Keen, CSLC), and that a marine wildlife monitor (MWO) was not required due to operational limitations of the personal watercraft used.

USGS research cruise 2016-673-FA took place over 5 consecutive days from September 26-30, 2016. All operations, including transits and surveying took place during daylight hours (0645 – 1345). Mapping was completed using hull-mounted 200-kHz , Odom 9 degree downward conical beam transducers and Odom Echotrac CV100 echo sounders at survey speeds of ~4 knots. Weather observations are provided in Appendix A and marine wildlife observations are

provided in Appendix B. As-surveyed track lines are shown in Figures 2-10, with start and end locations listed in Tables 1-9.

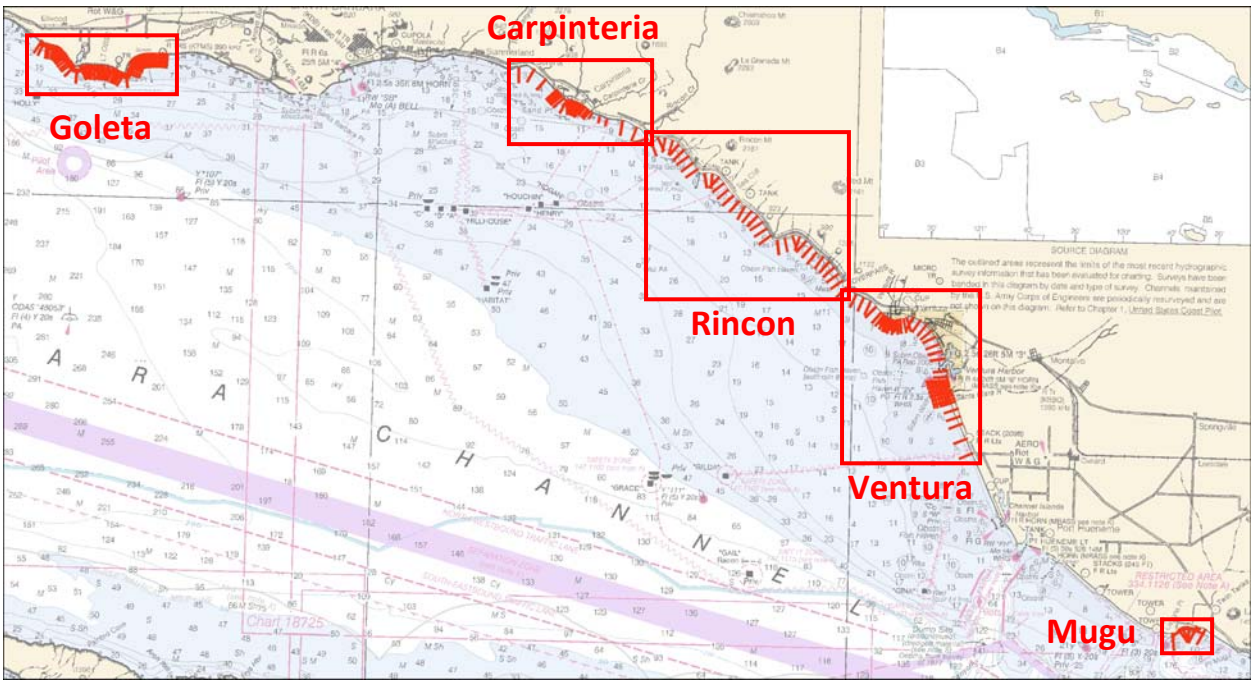

Figure 1. Overview of Santa Barbara Littoral Cell study area and planned survey lines in five focus areas.

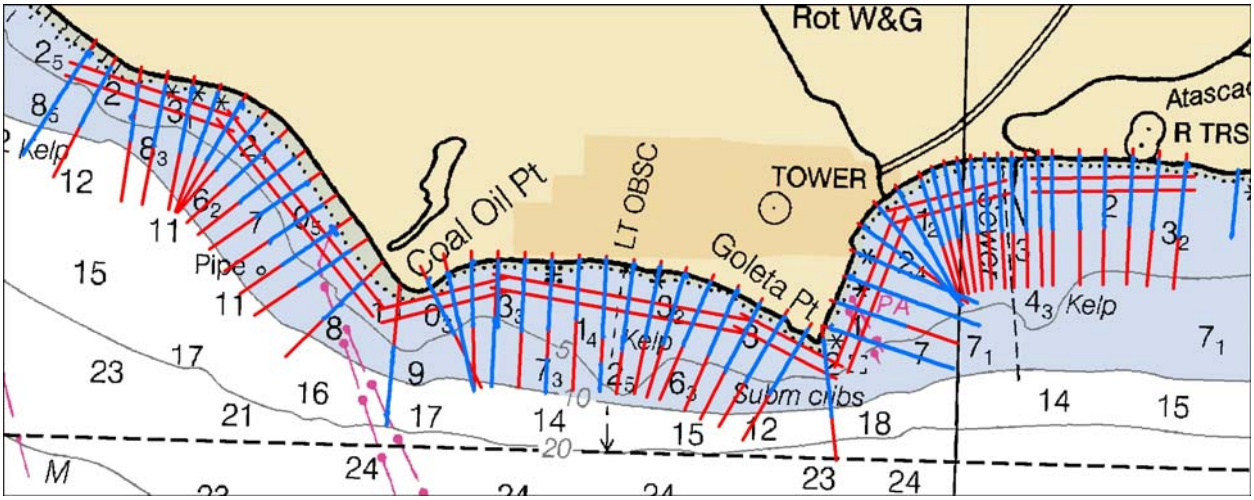

Figure 2. As-surveyed lines, Goleta, PWC. Target lines are in red, surveyed lines in blue.

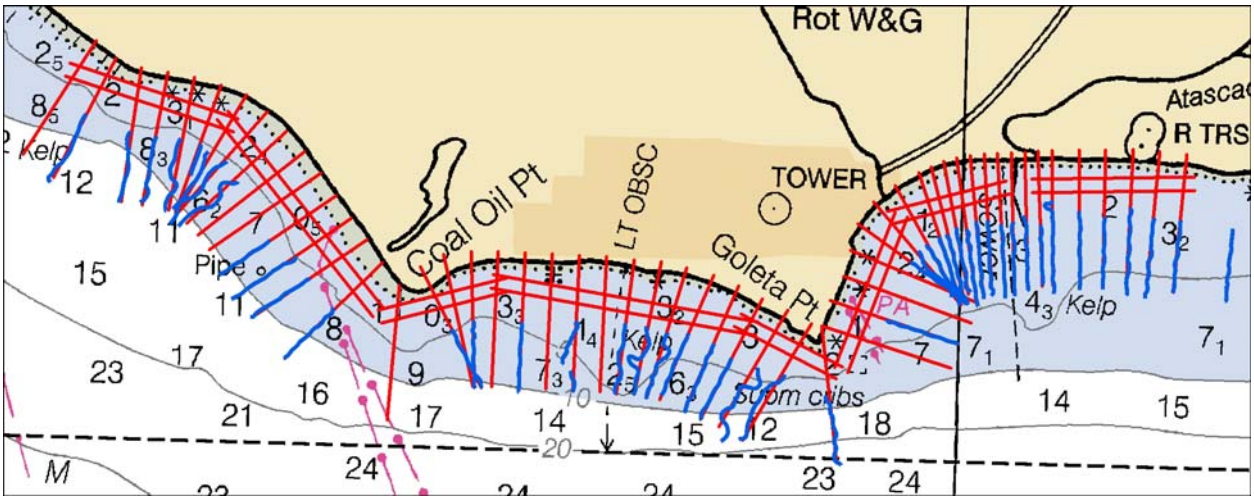

Figure 3. As-surveyed lines, Goleta, Small Boat. Target lines are in red, surveyed lines in blue.

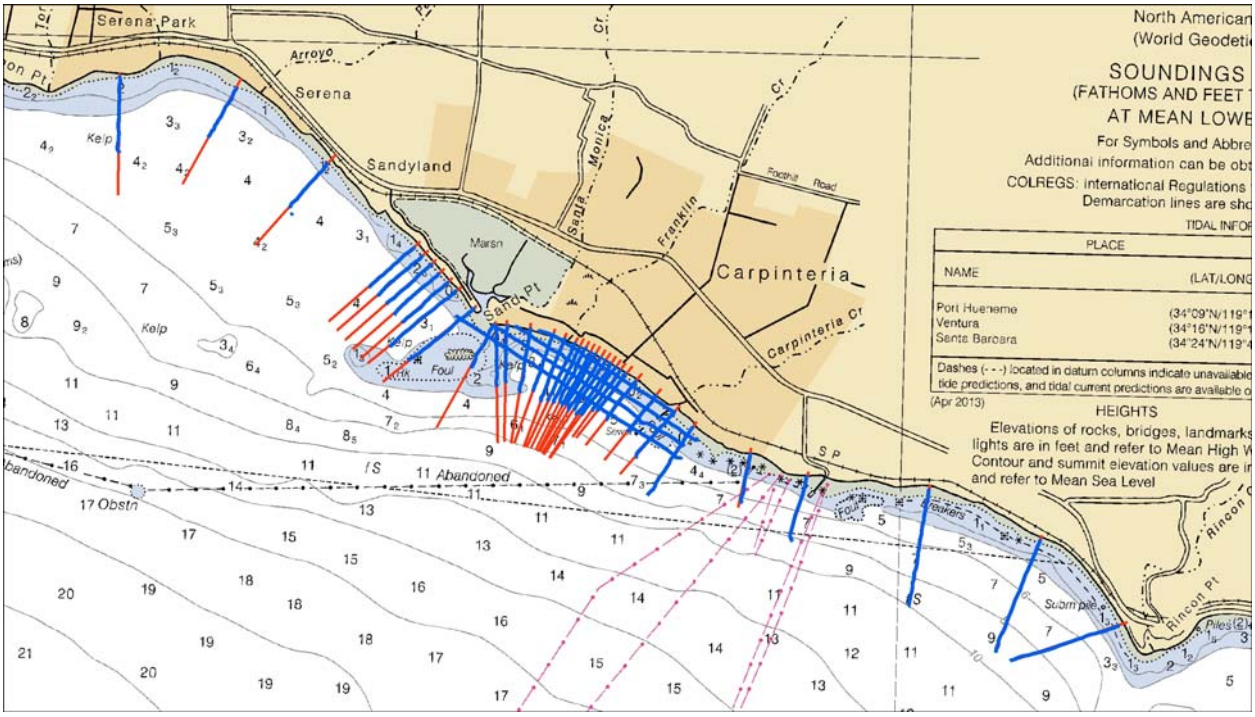

Figure 4. As-surveyed lines, Carpinteria, PWC. Target lines are in red, surveyed lines in blue.

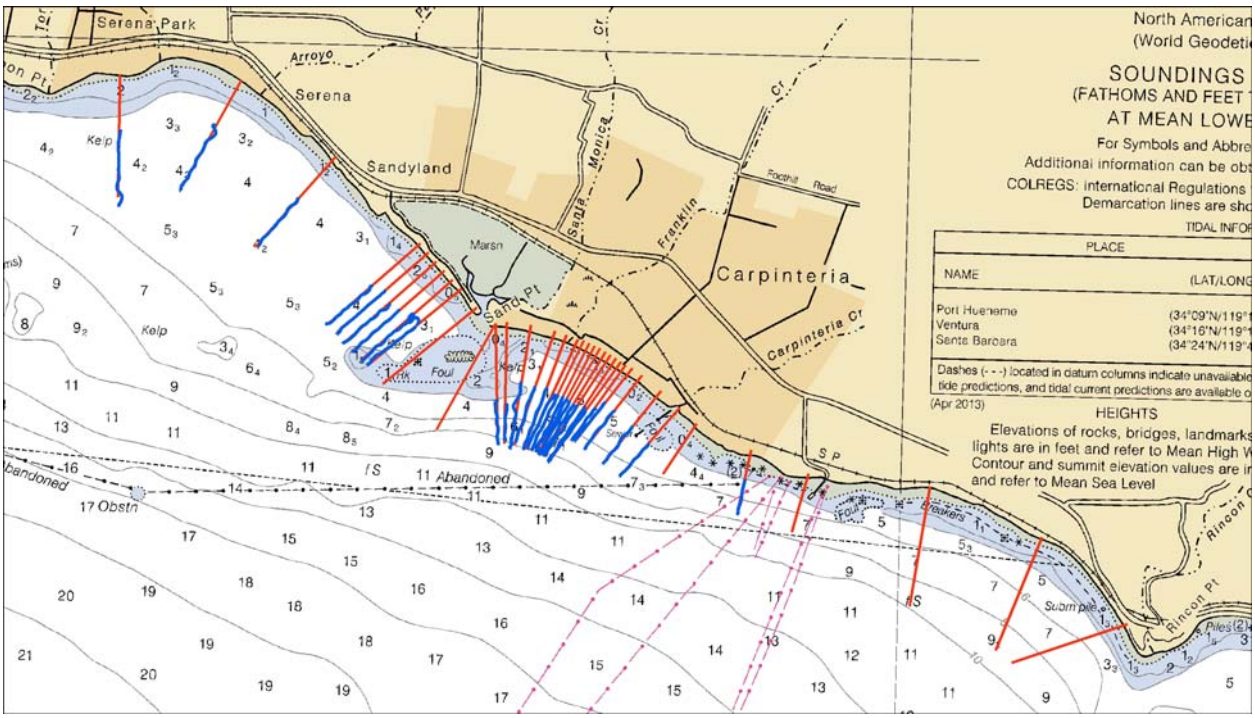

Figure 5. As-surveyed lines, Carpinteria, Small Boat. Target lines are in red, surveyed lines in blue.

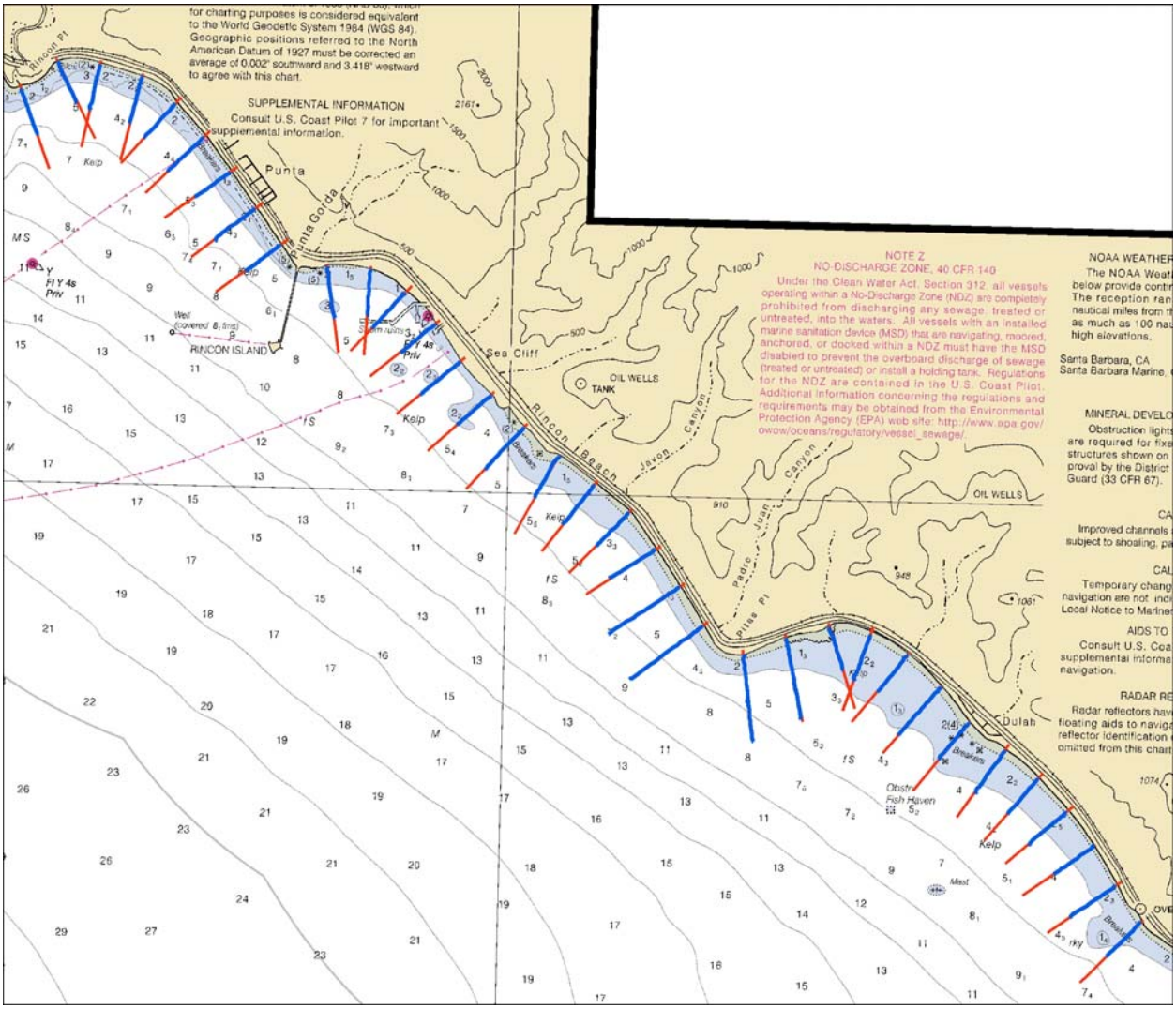

Figure 6. As-surveyed lines, Rincon, PWC. Target lines are in red, surveyed lines in blue.

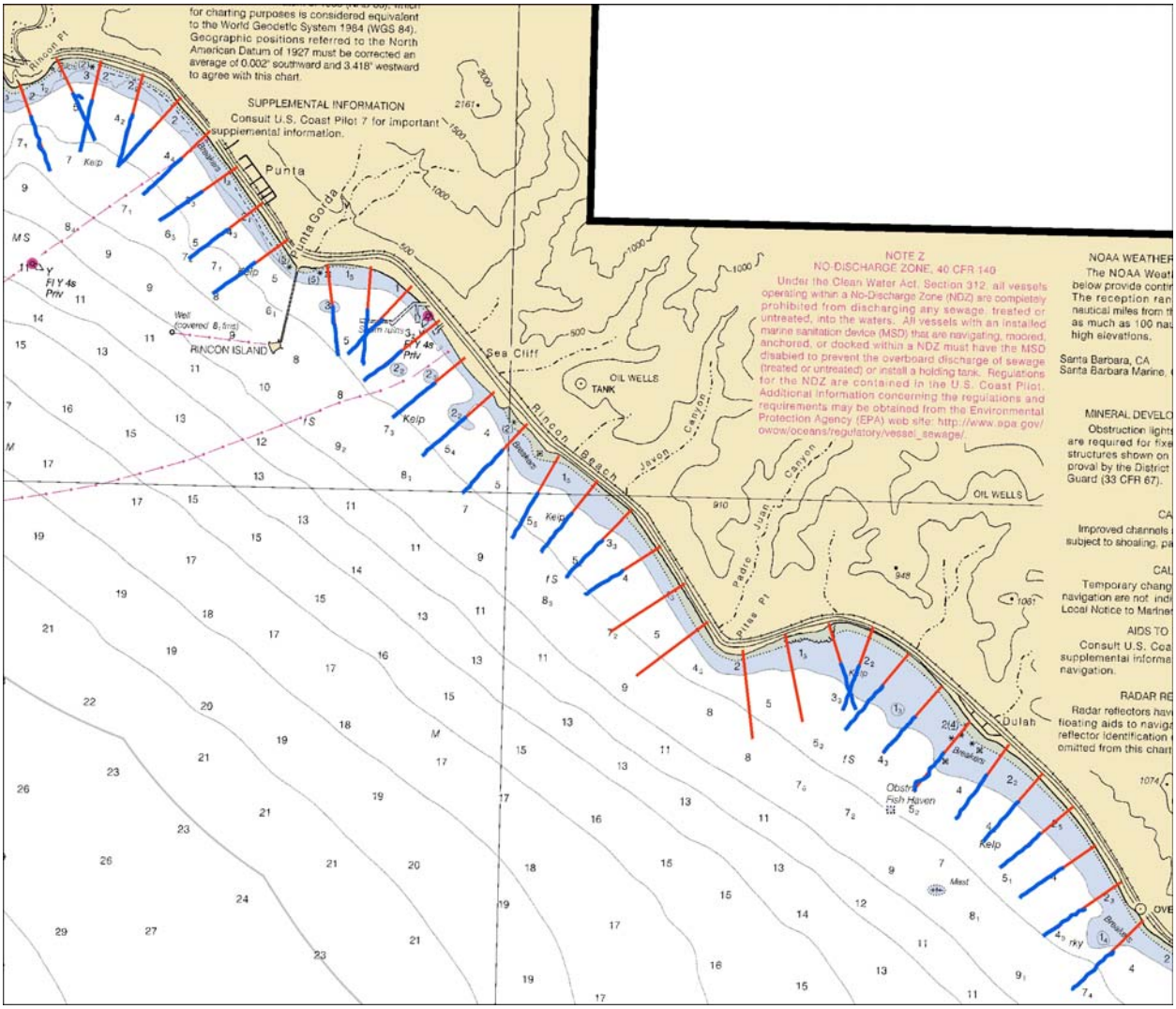

Figure 7. As-surveyed lines, Rincon, Small Boat. Target lines are in red, surveyed lines in blue.

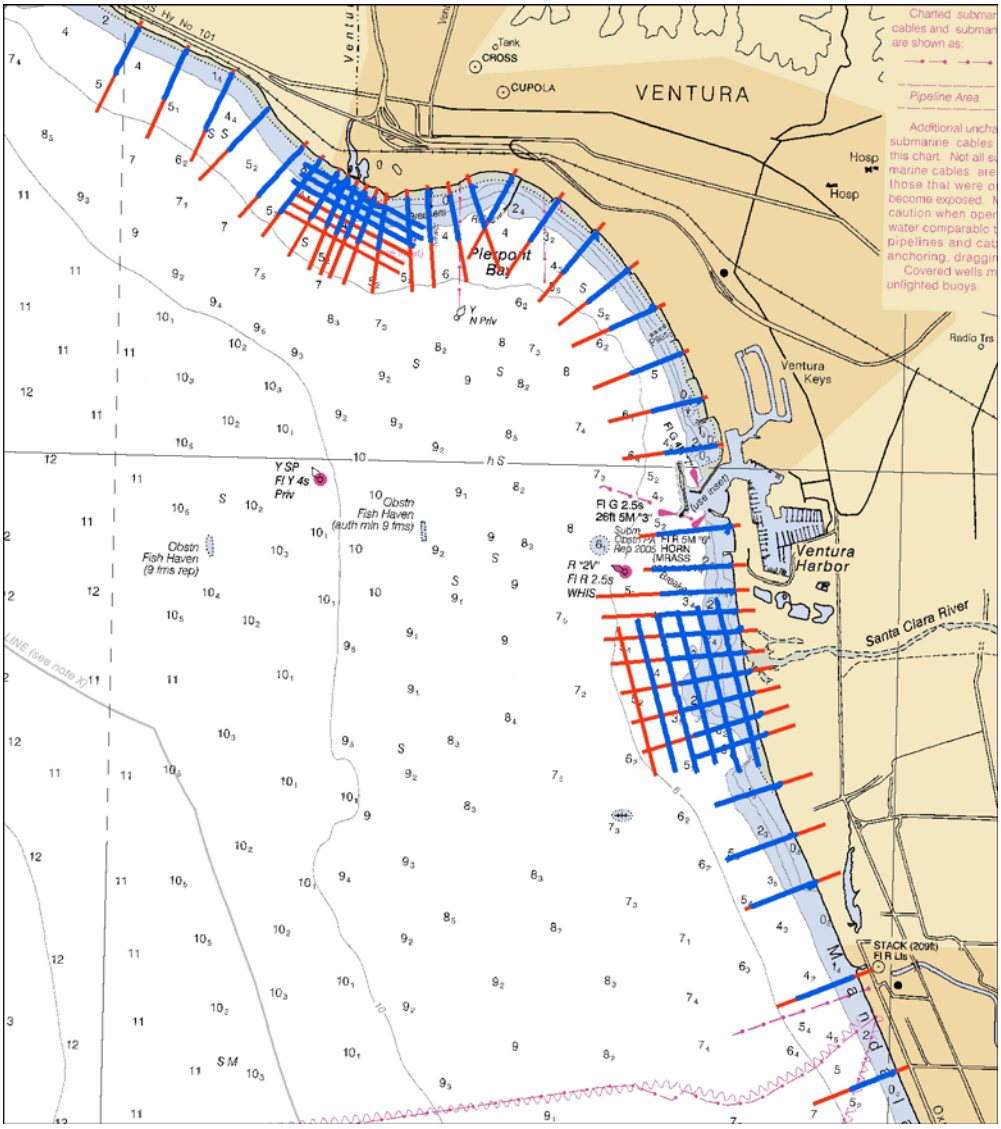

Figure 8. As-surveyed lines, Ventura, PWC. Target lines are in red, surveyed lines in blue.

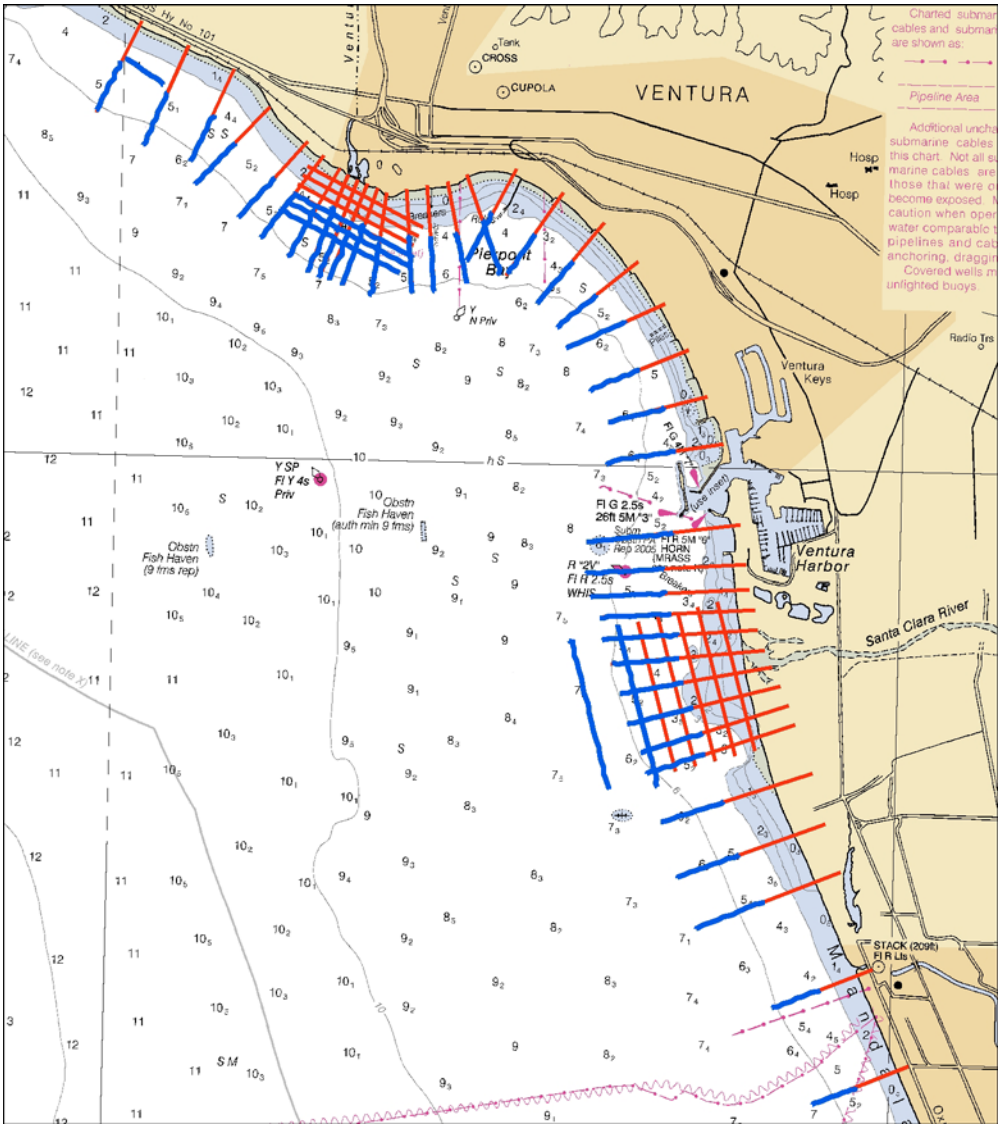

Figure 9. As-surveyed lines, Ventura, Small Boat. Target lines are in red, surveyed lines in blue.

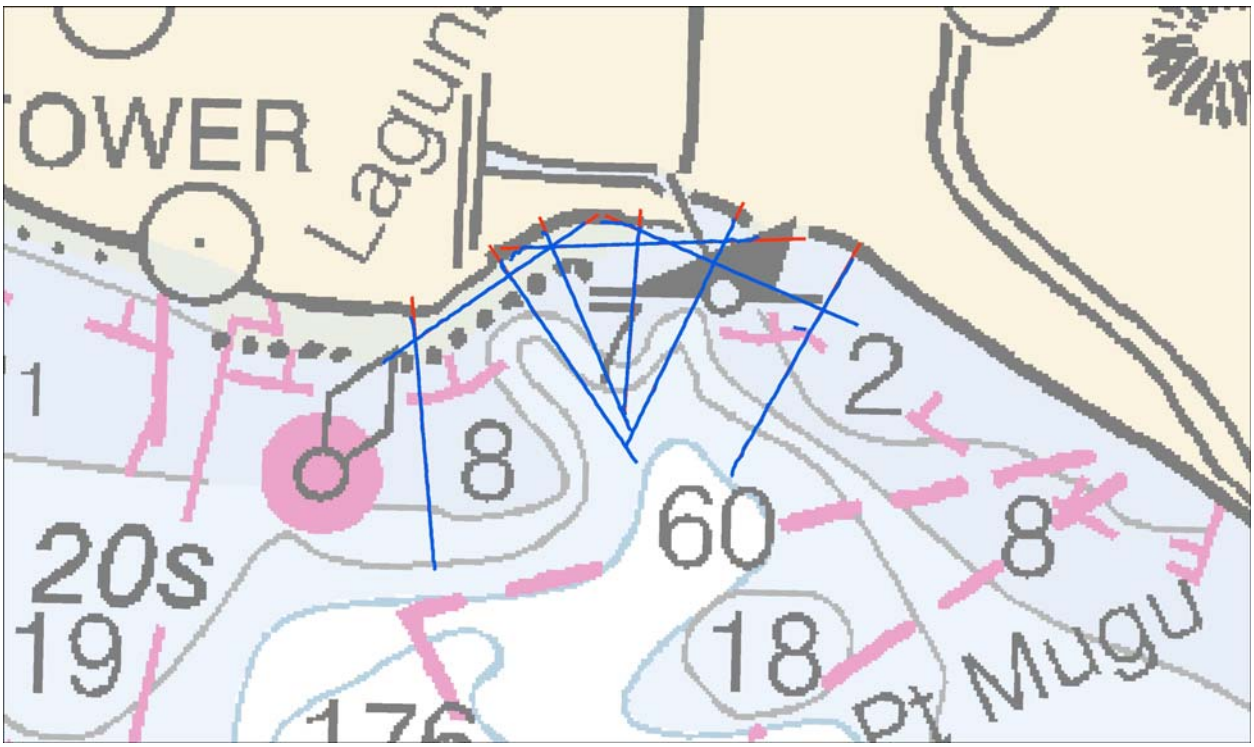

Figure 10. As-surveyed lines, Mugu, PWC. Target lines are in red, surveyed lines in blue.

Table 1. As-surveyed line endpoints, Goleta, PWC

	Start			End		
Line	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
000_0814	9/25/2016 8:14	34.411784	-119.811704	9/25/2016 8:14	34.412269	-119.811543
000_0820	9/25/2016 8:20	34.411909	-119.811682	9/25/2016 8:23	34.416363	-119.811201
001_0825	9/25/2016 8:25	34.416328	-119.815216	9/25/2016 8:27	34.411677	-119.815884
002_0828	9/25/2016 8:28	34.412127	-119.817919	9/25/2016 8:31	34.416885	-119.817649
003_0832	9/25/2016 8:32	34.416693	-119.81954	9/25/2016 8:34	34.412321	-119.819826
004_0836	9/25/2016 8:36	34.412214	-119.821728	9/25/2016 8:38	34.417045	-119.821931
005_0839	9/25/2016 8:39	34.416712	-119.823863	9/25/2016 8:43	34.413637	-119.823897
006_0844	9/25/2016 8:44	34.411965	-119.825902	9/25/2016 8:44	34.411965	-119.825902
006A0844	9/25/2016 8:44	34.411967	-119.82591	9/25/2016 8:47	34.416858	-119.826273
007_0847	9/25/2016 8:47	34.416653	-119.827084	9/25/2016 8:50	34.412133	-119.826955
008_0851	9/25/2016 8:51	34.411878	-119.828153	9/25/2016 8:54	34.416675	-119.828374
009_0855	9/25/2016 8:55	34.416558	-119.829161	9/25/2016 8:58	34.41168	-119.829148
010_0858	9/25/2016 8:58	34.411764	-119.829927	9/25/2016 9:01	34.416649	-119.830605
011_0902	9/25/2016 9:02	34.41646	-119.831321	9/25/2016 9:04	34.411783	-119.831109
012_0905	9/25/2016 9:05	34.411665	-119.831814	9/25/2016 9:07	34.416391	-119.832679
013_0908	9/25/2016 9:08	34.416113	-119.833531	9/25/2016 9:10	34.411591	-119.832809
014_0910	9/25/2016 9:10	34.411291	-119.83341	9/25/2016 9:13	34.415984	-119.834792
015_0914	9/25/2016 9:14	34.415378	-119.835461	9/25/2016 9:16	34.411143	-119.834207
016_0916	9/25/2016 9:16	34.410763	-119.834694	9/25/2016 9:20	34.414996	-119.836617
017_0921	9/25/2016 9:21	34.414071	-119.838079	9/25/2016 9:24	34.41029	-119.835586
018_0924	9/25/2016 9:24	34.40969	-119.836076	9/25/2016 9:27	34.413197	-119.840024
019_0928	9/25/2016 9:28	34.411967	-119.840935	9/25/2016 9:31	34.409247	-119.836621
020_0931	9/25/2016 9:31	34.408412	-119.836121	9/25/2016 9:34	34.410102	-119.841657
021_0935	9/25/2016 9:35	34.408559	-119.841797	9/25/2016 9:38	34.406932	-119.836818
022_0939	9/25/2016 9:39	34.405275	-119.837466	9/25/2016 9:42	34.406752	-119.843077
023_0943	9/25/2016 9:43	34.4053	-119.84338	9/25/2016 9:45	34.403713	-119.83824
024_0949	9/25/2016 9:49	34.403957	-119.843725	9/25/2016 9:49	34.403986	-119.843722
024_0951	9/25/2016 9:51	34.404112	-119.843994	9/25/2016 9:53	34.39992	-119.843383
025_0956	9/25/2016 9:56	34.400537	-119.84816	9/25/2016 9:59	34.40498	-119.845396
026_1000	9/25/2016 10:00	34.405471	-119.847264	9/25/2016 10:03	34.401267	-119.850281
027_1003	9/25/2016 10:03	34.401925	-119.851785	9/25/2016 10:07	34.406592	-119.849279
028_1007	9/25/2016 10:07	34.407091	-119.851043	9/25/2016 10:09	34.406098	-119.851791
028_1011	9/25/2016 10:11	34.406435	-119.851586	9/25/2016 10:13	34.403034	-119.853279
029_1014	9/25/2016 10:14	34.403495	-119.855312	9/25/2016 10:17	34.407966	-119.853299
030_1018	9/25/2016 10:18	34.408099	-119.855054	9/25/2016 10:21	34.403566	-119.856959
031_1021	9/25/2016 10:21	34.403946	-119.858249	9/25/2016 10:24	34.408849	-119.857347
032_1025	9/25/2016 10:25	34.408777	-119.859266	9/25/2016 10:29	34.404133	-119.860107
032_1029	9/25/2016 10:29	34.404144	-119.860157	9/25/2016 10:30	34.403183	-119.860258

033_1031	9/25/2016 10:31	34.403978	-119.861616	9/25/2016 10:34	34.409105	-119.861749
034_1035	9/25/2016 10:35	34.408921	-119.863693	9/25/2016 10:38	34.405246	-119.864052
035_1040	9/25/2016 10:40	34.4044	-119.866093	9/25/2016 10:43	34.4091	-119.866032
036_1044	9/25/2016 10:44	34.408867	-119.867961	9/25/2016 10:47	34.40417	-119.868318
037_1048	9/25/2016 10:48	34.404419	-119.870125	9/25/2016 10:51	34.408997	-119.870343
038_1051	9/25/2016 10:51	34.40865	-119.872194	9/25/2016 10:55	34.404422	-119.872259
039_1055	9/25/2016 10:55	34.404762	-119.873279	9/25/2016 10:58	34.407602	-119.87425
040_1100	9/25/2016 11:00	34.407588	-119.875703	9/25/2016 11:03	34.403885	-119.873667
041_1106	9/25/2016 11:06	34.401899	-119.878457	9/25/2016 11:07	34.402315	-119.878591
041_1107	9/25/2016 11:07	34.402008	-119.87866	9/25/2016 11:08	34.403035	-119.878537
042_1111	9/25/2016 11:11	34.404662	-119.884186	9/25/2016 11:13	34.4073	-119.881109
043_1115	9/25/2016 11:15	34.406742	-119.886305	9/25/2016 11:18	34.40932	-119.882227
044_1119	9/25/2016 11:19	34.410366	-119.883613	9/25/2016 11:22	34.408174	-119.887706
045_1123	9/25/2016 11:23	34.409564	-119.888756	9/25/2016 11:25	34.412303	-119.88463
046_1126	9/25/2016 11:26	34.413448	-119.885824	9/25/2016 11:29	34.411295	-119.889943
047_1129	9/25/2016 11:29	34.412195	-119.891182	9/25/2016 11:32	34.415259	-119.887056
048_1133	9/25/2016 11:33	34.41627	-119.888313	9/25/2016 11:36	34.413451	-119.892161
049_1136	9/25/2016 11:36	34.414361	-119.893154	9/25/2016 11:39	34.417786	-119.889769
050_1140	9/25/2016 11:40	34.418476	-119.891232	9/25/2016 11:43	34.414966	-119.893987
051_1144	9/25/2016 11:44	34.415205	-119.894884	9/25/2016 11:47	34.419411	-119.893221
052_1153	9/25/2016 11:53	34.419509	-119.895028	9/25/2016 11:54	34.419053	-119.895336
052_1155	9/25/2016 11:55	34.419557	-119.895035	9/25/2016 11:58	34.415487	-119.896095
053_1159	9/25/2016 11:59	34.415771	-119.898099	9/25/2016 12:01	34.420021	-119.89738
054_1202	9/25/2016 12:02	34.419844	-119.899406	9/25/2016 12:05	34.416107	-119.900097
055_1209	9/25/2016 12:09	34.417028	-119.904195	9/25/2016 12:12	34.421112	-119.901803
056_1212	9/25/2016 12:12	34.421614	-119.903667	9/25/2016 12:16	34.41833	-119.906305
056_1220	9/25/2016 12:20	34.41902	-119.90575	9/25/2016 12:23	34.414997	-119.908729
041_1230	9/25/2016 12:30	34.397795	-119.879041	9/25/2016 12:33	34.399902	-119.878765
041_1234	9/25/2016 12:34	34.402746	-119.878506	9/25/2016 12:36	34.399979	-119.878759
039_1238	9/25/2016 12:38	34.400212	-119.872081	9/25/2016 12:40	34.405016	-119.873409
037_1242	9/25/2016 12:42	34.405064	-119.870556	9/25/2016 12:44	34.400417	-119.870594
035_1245	9/25/2016 12:45	34.400189	-119.866343	9/25/2016 12:47	34.40245	-119.866228
033_1249	9/25/2016 12:49	34.400332	-119.861886	9/25/2016 12:50	34.402262	-119.861922
024_1301	9/25/2016 13:01	34.40082	-119.843615	9/25/2016 13:02	34.399064	-119.843251
023_1303	9/25/2016 13:03	34.403939	-119.839187	9/25/2016 13:06	34.402548	-119.83348
021_1307	9/25/2016 13:07	34.405416	-119.831614	9/25/2016 13:10	34.40715	-119.837595
020_1311	9/25/2016 13:11	34.408619	-119.837177	9/25/2016 13:14	34.406982	-119.831721
018_1315	9/25/2016 13:15	34.406779	-119.83299	9/25/2016 13:18	34.410257	-119.836849
017_1319	9/25/2016 13:19	34.410906	-119.836122	9/25/2016 13:22	34.406745	-119.833084

Table 2. As-surveyed line endpoints, Goleta, Small Boat

	Start			End		
Line	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
000_0832	9/25/2016 8:32	34.407587	-119.811971	9/25/2016 8:33	34.408528	-119.811901
000_0835	9/25/2016 8:35	34.40841	-119.811991	9/25/2016 8:37	34.412411	-119.811563
001_0840	9/25/2016 8:40	34.412873	-119.815737	9/25/2016 8:42	34.408044	-119.816195
002_0844	9/25/2016 8:44	34.407599	-119.818407	9/25/2016 8:47	34.412974	-119.817853
003_0848	9/25/2016 8:48	34.413586	-119.819789	9/25/2016 8:51	34.407821	-119.819896
004_0853	9/25/2016 8:53	34.408117	-119.821809	9/25/2016 8:55	34.41295	-119.82182
005_0856	9/25/2016 8:56	34.413312	-119.823884	9/25/2016 8:59	34.408044	-119.823692
006_0900	9/25/2016 9:00	34.407747	-119.825754	9/25/2016 9:03	34.412957	-119.826036
006_0903	9/25/2016 9:03	34.412967	-119.826035	9/25/2016 9:04	34.413942	-119.826117
007_0905	9/25/2016 9:05	34.412325	-119.826944	9/25/2016 9:07	34.408264	-119.826678
008_0908	9/25/2016 9:08	34.407966	-119.827819	9/25/2016 9:10	34.412526	-119.828209
008_0910	9/25/2016 9:10	34.412536	-119.828213	9/25/2016 9:10	34.412845	-119.828435
009_0911	9/25/2016 9:11	34.412454	-119.829161	9/25/2016 9:13	34.407529	-119.828865
010_0914	9/25/2016 9:14	34.407349	-119.829612	9/25/2016 9:16	34.412294	-119.8301
011_0917	9/25/2016 9:17	34.412485	-119.831184	9/25/2016 9:20	34.407556	-119.830724
012_0920	9/25/2016 9:20	34.407275	-119.831358	9/25/2016 9:23	34.412433	-119.832103
013_0924	9/25/2016 9:24	34.411888	-119.832881	9/25/2016 9:26	34.406825	-119.831806
014_0933	9/25/2016 9:33	34.407737	-119.832429	9/25/2016 9:35	34.411973	-119.833702
015_0936	9/25/2016 9:36	34.411519	-119.834422	9/25/2016 9:39	34.40692	-119.832617
016_0940	9/25/2016 9:40	34.406952	-119.833121	9/25/2016 9:43	34.411366	-119.835021
017_0944	9/25/2016 9:44	34.410784	-119.836029	9/25/2016 9:47	34.406844	-119.833252
018_0947	9/25/2016 9:47	34.407312	-119.833943	9/25/2016 9:50	34.410345	-119.836667
024_0956	9/25/2016 9:56	34.400552	-119.843792	9/25/2016 9:59	34.395964	-119.842415
025_1004	9/25/2016 10:04	34.397526	-119.850599	9/25/2016 10:07	34.401879	-119.847129
026_1009	9/25/2016 10:09	34.402303	-119.849357	9/25/2016 10:13	34.397361	-119.852081
027_1044	9/25/2016 10:44	34.398761	-119.853693	9/25/2016 10:47	34.402859	-119.851431
028_1048	9/25/2016 10:48	34.403763	-119.852838	9/25/2016 10:51	34.399173	-119.855085
029_1052	9/25/2016 10:52	34.400299	-119.856978	9/25/2016 10:55	34.404209	-119.855015
030_1055	9/25/2016 10:55	34.404308	-119.854978	9/25/2016 10:55	34.404414	-119.85495
030_1056	9/25/2016 10:56	34.404446	-119.856593	9/25/2016 10:59	34.399991	-119.858169
031_1059	9/25/2016 10:59	34.400289	-119.85922	9/25/2016 10:59	34.400449	-119.85912
031A1059	9/25/2016 10:59	34.400462	-119.859113	9/25/2016 11:03	34.404837	-119.858326
032_1104	9/25/2016 11:04	34.404964	-119.860055	9/25/2016 11:06	34.401193	-119.860542
032_1109	9/25/2016 11:09	34.401344	-119.860613	9/25/2016 11:09	34.400257	-119.86067
042_1119	9/25/2016 11:19	34.405491	-119.883456	9/25/2016 11:22	34.402041	-119.887292
043_1124	9/25/2016 11:24	34.404715	-119.890059	9/25/2016 11:26	34.407377	-119.885451
044_1128	9/25/2016 11:28	34.408816	-119.886621	9/25/2016 11:30	34.405882	-119.891607
045_1132	9/25/2016 11:32	34.407489	-119.892641	9/25/2016 11:35	34.409843	-119.888697

048_1148	9/25/2016 11:48	34.41365	-119.891427	9/25/2016 11:51	34.410644	-119.896021
049_1152	9/25/2016 11:52	34.411801	-119.896517	9/25/2016 11:55	34.415005	-119.892333
050_1156	9/25/2016 11:56	34.415614	-119.893848	9/25/2016 11:59	34.410776	-119.896698
051_1201	9/25/2016 12:01	34.414017	-119.89519	9/25/2016 12:02	34.416086	-119.894413
052_1204	9/25/2016 12:04	34.416446	-119.896094	9/25/2016 12:07	34.411605	-119.897065
053_1208	9/25/2016 12:08	34.412172	-119.899134	9/25/2016 12:11	34.416495	-119.898045
054_1212	9/25/2016 12:12	34.416812	-119.900127	9/25/2016 12:15	34.412071	-119.900894
055_1218	9/25/2016 12:18	34.413324	-119.906439	9/25/2016 12:21	34.417869	-119.903725
040_1235	9/25/2016 12:35	34.400476	-119.871359	9/25/2016 12:37	34.404238	-119.873883
038_1239	9/25/2016 12:39	34.404828	-119.872259	9/25/2016 12:41	34.400441	-119.871908
036_1243	9/25/2016 12:43	34.400254	-119.868391	9/25/2016 12:45	34.404823	-119.868343
034_1248	9/25/2016 12:48	34.404957	-119.864049	9/25/2016 12:49	34.402217	-119.864988
034_1251	9/25/2016 12:51	34.401685	-119.864301	9/25/2016 12:52	34.400362	-119.864067
022_1306	9/25/2016 13:06	34.405722	-119.839035	9/25/2016 13:08	34.404224	-119.83322
019_1316	9/25/2016 13:16	34.406964	-119.832797	9/25/2016 13:19	34.409574	-119.837286

Table 3. As-surveyed line endpoints, Carpinteria, PWC

	Start			End		
Line	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
001_1118	9/27/2016 11:18	34.375006	-119.480235	9/27/2016 11:22	34.372251	-119.489811
002_1123	9/27/2016 11:23	34.372868	-119.491115	9/27/2016 11:28	34.381245	-119.487412
003_1131	9/27/2016 11:31	34.384738	-119.497429	9/27/2016 11:31	34.384712	-119.497484
003A1131	9/27/2016 11:31	34.384708	-119.497484	9/27/2016 11:36	34.376091	-119.49902
004_1138	9/27/2016 11:38	34.380705	-119.50953	9/27/2016 11:38	34.380709	-119.509533
004A1138	9/27/2016 11:38	34.380713	-119.509535	9/27/2016 11:41	34.385533	-119.508462
005_0828	9/28/2016 8:28	34.383477	-119.514101	9/28/2016 8:30	34.387117	-119.513503
006_0833	9/28/2016 8:33	34.388844	-119.518634	9/28/2016 8:36	34.383837	-119.522555
007_0837	9/28/2016 8:37	34.386615	-119.523663	9/28/2016 8:40	34.390036	-119.520382
008_0841	9/28/2016 8:41	34.391154	-119.521977	9/28/2016 8:42	34.388509	-119.524462
009_0843	9/28/2016 8:43	34.389341	-119.526261	9/28/2016 8:45	34.392283	-119.523826
010_0846	9/28/2016 8:46	34.3928	-119.524699	9/28/2016 8:48	34.389962	-119.527253
011_0848	9/28/2016 8:48	34.389966	-119.527662	9/28/2016 8:50	34.393099	-119.525257
012_0850	9/28/2016 8:50	34.393261	-119.525565	9/28/2016 8:52	34.389632	-119.528647
013_0853	9/28/2016 8:53	34.389577	-119.529072	9/28/2016 8:55	34.393555	-119.526183
014_0856	9/28/2016 8:56	34.393746	-119.526519	9/28/2016 8:58	34.389977	-119.529327
015_0858	9/28/2016 8:58	34.389937	-119.52975	9/28/2016 9:00	34.393995	-119.527027
016_0901	9/28/2016 9:01	34.394188	-119.527425	9/28/2016 9:04	34.390343	-119.529973
017_0904	9/28/2016 9:04	34.39031	-119.530293	9/28/2016 9:06	34.394402	-119.527933
018_0907	9/28/2016 9:07	34.394572	-119.528348	9/28/2016 9:09	34.390561	-119.530616
019_0909	9/28/2016 9:09	34.390504	-119.531026	9/28/2016 9:11	34.394726	-119.528928
020_0912	9/28/2016 9:12	34.394928	-119.529284	9/28/2016 9:14	34.390617	-119.53168
021_0914	9/28/2016 9:14	34.390577	-119.532193	9/28/2016 9:17	34.395273	-119.530304
022_0917	9/28/2016 9:17	34.395548	-119.531192	9/28/2016 9:20	34.39127	-119.53302
023_0920	9/28/2016 9:20	34.391266	-119.534074	9/28/2016 9:23	34.395967	-119.533416
024_0924	9/28/2016 9:24	34.39614	-119.535273	9/28/2016 9:26	34.39184	-119.535447
025_0927	9/28/2016 9:27	34.391632	-119.536205	9/28/2016 9:30	34.396127	-119.536447
026_0930	9/28/2016 9:30	34.39616	-119.536542	9/28/2016 9:33	34.392996	-119.538675
037_0935	9/28/2016 9:35	34.395832	-119.532659	9/28/2016 9:41	34.389998	-119.520282
038_0942	9/28/2016 9:42	34.388085	-119.518188	9/28/2016 9:50	34.396059	-119.53482
039_0951	9/28/2016 9:51	34.396	-119.536404	9/28/2016 9:59	34.387545	-119.519386
040_1000	9/28/2016 10:00	34.386678	-119.519622	9/28/2016 10:10	34.39677	-119.540048
027_1011	9/28/2016 10:11	34.397281	-119.538399	9/28/2016 10:15	34.393362	-119.544153
028_1015	9/28/2016 10:15	34.394245	-119.545795	9/28/2016 10:18	34.398638	-119.540149
029_1019	9/28/2016 10:19	34.399202	-119.540767	9/28/2016 10:21	34.396172	-119.544817
030_1022	9/28/2016 10:22	34.396698	-119.545535	9/28/2016 10:24	34.399872	-119.541677
031_1025	9/28/2016 10:25	34.400443	-119.542276	9/28/2016 10:27	34.397521	-119.54626
032A1027	9/28/2016 10:27	34.398011	-119.546999	9/28/2016 10:29	34.401162	-119.543226

033_1030	9/28/2016 10:30	34.40168	-119.54384	9/28/2016 10:30	34.401577	-119.54405
033_1038	9/28/2016 10:38	34.401638	-119.543943	9/28/2016 10:41	34.398729	-119.547858
034_1043	9/28/2016 10:43	34.40397	-119.555002	9/28/2016 10:43	34.404022	-119.554868
034A1043	9/28/2016 10:43	34.404509	-119.555031	9/28/2016 10:45	34.407838	-119.551844
035_1048	9/28/2016 10:48	34.413175	-119.560084	9/28/2016 10:51	34.409542	-119.56254
036_1053	9/28/2016 10:53	34.40819	-119.570394	9/28/2016 10:57	34.413827	-119.570608
046_1104	9/28/2016 11:04	34.414278	-119.596342	9/28/2016 11:06	34.418311	-119.594838
047_1111	9/28/2016 11:11	34.419007	-119.628449	9/28/2016 11:13	34.415185	-119.629213
048_1117	9/28/2016 11:17	34.416994	-119.647039	9/28/2016 11:19	34.414694	-119.647996
049_1124	9/28/2016 11:24	34.414619	-119.678986	9/28/2016 11:26	34.410849	-119.678187

Table 4. As-surveyed line endpoints, Carpinteria, Small Boat

	Start			End		
Line	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
005_0839	9/28/2016 8:39	34.38272	-119.514439	9/28/2016 8:41	34.385314	-119.513886
007_0844	9/28/2016 8:44	34.387788	-119.522534	9/28/2016 8:46	34.385317	-119.525097
008_0847	9/28/2016 8:47	34.386222	-119.52661	9/28/2016 8:49	34.389047	-119.524043
009_0850	9/28/2016 8:50	34.390152	-119.525701	9/28/2016 8:52	34.38722	-119.528255
010_0853	9/28/2016 8:53	34.387825	-119.529206	9/28/2016 8:55	34.390609	-119.5267
010_0855	9/28/2016 8:55	34.390615	-119.526695	9/28/2016 8:55	34.390778	-119.526561
011_0856	9/28/2016 8:56	34.390304	-119.527333	9/28/2016 8:57	34.38788	-119.529436
012_0859	9/28/2016 8:59	34.386339	-119.531323	9/28/2016 9:01	34.390124	-119.528289
013_0902	9/28/2016 9:02	34.390441	-119.528348	9/28/2016 9:04	34.386248	-119.531493
014_0905	9/28/2016 9:05	34.386662	-119.531742	9/28/2016 9:07	34.390494	-119.529002
015_0908	9/28/2016 9:08	34.39054	-119.529273	9/28/2016 9:10	34.386757	-119.531993
016_0910	9/28/2016 9:10	34.386746	-119.532294	9/28/2016 9:12	34.390812	-119.529726
017_0913	9/28/2016 9:13	34.39097	-119.529917	9/28/2016 9:15	34.386774	-119.532253
018_0915	9/28/2016 9:15	34.386916	-119.532522	9/28/2016 9:18	34.391122	-119.530327
019_0918	9/28/2016 9:18	34.391208	-119.530746	9/28/2016 9:20	34.387115	-119.533018
020_0921	9/28/2016 9:21	34.387212	-119.533351	9/28/2016 9:23	34.391303	-119.531056
021_0924	9/28/2016 9:23	34.391716	-119.531758	9/28/2016 9:26	34.387088	-119.533674
022_0927	9/28/2016 9:27	34.38758	-119.534444	9/28/2016 9:29	34.391774	-119.532832
023_0930	9/28/2016 9:30	34.392069	-119.534058	9/28/2016 9:32	34.387518	-119.534831
023_0939	9/28/2016 9:39	34.387209	-119.534805	9/28/2016 9:40	34.38805	-119.534798
024_0941	9/28/2016 9:41	34.387676	-119.535337	9/28/2016 9:42	34.390502	-119.535328
025_0943	9/28/2016 9:43	34.390736	-119.536108	9/28/2016 9:44	34.387382	-119.535986
028_1012	9/28/2016 10:12	34.393102	-119.547892	9/28/2016 10:15	34.396034	-119.543589
029_1015	9/28/2016 10:15	34.396153	-119.543482	9/28/2016 10:16	34.396673	-119.544217
029_1016	9/28/2016 10:16	34.396663	-119.544215	9/28/2016 10:19	34.393391	-119.54841
030_1020	9/28/2016 10:20	34.394093	-119.54935	9/28/2016 10:22	34.39724	-119.545077
031_1023	9/28/2016 10:23	34.39764	-119.545869	9/28/2016 10:26	34.394654	-119.550081
032_1027	9/28/2016 10:27	34.395321	-119.550639	9/28/2016 10:29	34.398625	-119.546382
033_1030	9/28/2016 10:30	34.398957	-119.547542	9/28/2016 10:33	34.396045	-119.551702
034_1044	9/28/2016 10:44	34.401732	-119.557783	9/28/2016 10:46	34.405315	-119.554401
035_1051	9/28/2016 10:51	34.4105	-119.561919	9/28/2016 10:54	34.405632	-119.564854
036_1057	9/28/2016 10:57	34.404313	-119.570348	9/28/2016 11:00	34.410041	-119.570386

Table 5. As-surveyed line endpoints, Rincon, PWC

	Start			End		
Line	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
001_0811	9/27/2016 8:11	34.291706	-119.338859	9/27/2016 8:14	34.288245	-119.342768
002_0815	9/27/2016 8:15	34.292085	-119.34729	9/27/2016 8:18	34.295362	-119.341974
003_0820	9/27/2016 8:20	34.299247	-119.344662	9/27/2016 8:20	34.29925	-119.344803
003A0820	9/27/2016 8:20	34.299228	-119.344535	9/27/2016 8:23	34.296386	-119.349351
004_0825	9/27/2016 8:25	34.299283	-119.352569	9/27/2016 8:28	34.302589	-119.348129
005_0830	9/27/2016 8:30	34.305812	-119.351552	9/27/2016 8:32	34.302385	-119.355124
006_0834	9/27/2016 8:34	34.304212	-119.359027	9/27/2016 8:37	34.308654	-119.355637
007_0841	9/27/2016 8:41	34.311248	-119.360041	9/27/2016 8:44	34.307721	-119.363682
008_0845	9/27/2016 8:45	34.310043	-119.368646	9/27/2016 8:48	34.314836	-119.363734
008_0848	9/27/2016 8:48	34.314841	-119.363726	9/27/2016 8:49	34.314744	-119.363826
009_0850	9/27/2016 8:50	34.317933	-119.367772	9/27/2016 8:53	34.314353	-119.371273
010_0854	9/27/2016 8:54	34.315351	-119.374023	9/27/2016 8:57	34.320031	-119.372289
011_0859	9/27/2016 8:59	34.320611	-119.377439	9/27/2016 9:01	34.316438	-119.375534
012_0903	9/27/2016 9:03	34.314216	-119.38096	9/27/2016 9:06	34.319418	-119.382565
013A0908	9/27/2016 9:08	34.317594	-119.38756	9/27/2016 9:11	34.312501	-119.386964
013_0916	9/27/2016 9:16	34.313423	-119.38698	9/27/2016 9:18	34.309035	-119.386203
012_0920	9/27/2016 9:20	34.311289	-119.380545	9/27/2016 9:22	34.315647	-119.38149
014_0928	9/27/2016 9:28	34.315046	-119.401303	9/27/2016 9:32	34.320517	-119.392746
015_0934	9/27/2016 9:34	34.324261	-119.39562	9/27/2016 9:34	34.324263	-119.395621
015A0934	9/27/2016 9:34	34.324271	-119.395624	9/27/2016 9:38	34.319504	-119.404053
016_0941	9/27/2016 9:41	34.325171	-119.404133	9/27/2016 9:44	34.328143	-119.398726
017_0946	9/27/2016 9:46	34.331596	-119.402013	9/27/2016 9:48	34.328333	-119.405824
018_0952	9/27/2016 9:52	34.330445	-119.409978	9/27/2016 9:55	34.334397	-119.406235
019_0956	9/27/2016 9:56	34.33705	-119.410443	9/27/2016 9:59	34.332983	-119.413431
020_1000	9/27/2016 10:00	34.335727	-119.41948	9/27/2016 10:03	34.339988	-119.414958
021_1004	9/27/2016 10:04	34.34308	-119.418878	9/27/2016 10:07	34.340146	-119.423019
022_1008	9/27/2016 10:08	34.343049	-119.427347	9/27/2016 10:10	34.346486	-119.422887
023_1012	9/27/2016 10:12	34.350027	-119.425937	9/27/2016 10:14	34.347204	-119.430034
024_1016	9/27/2016 10:16	34.349548	-119.433449	9/27/2016 10:18	34.353215	-119.429714
024_1018	9/27/2016 10:18	34.35322	-119.429714	9/27/2016 10:19	34.353223	-119.430161
025_1020	9/27/2016 10:20	34.355462	-119.433801	9/27/2016 10:22	34.3509	-119.43423
026_1026	9/27/2016 10:26	34.350606	-119.438102	9/27/2016 10:29	34.355725	-119.439171
027_1031	9/27/2016 10:31	34.357704	-119.445007	9/27/2016 10:34	34.355152	-119.449167
028_1035	9/27/2016 10:35	34.358031	-119.452868	9/27/2016 10:38	34.361384	-119.448273
029_1040	9/27/2016 10:40	34.364838	-119.451328	9/27/2016 10:42	34.362444	-119.455513
030_1043	9/27/2016 10:43	34.364858	-119.458807	9/27/2016 10:46	34.368448	-119.454668
031_1048	9/27/2016 10:48	34.371565	-119.458149	9/27/2016 10:48	34.371266	-119.458564
031_1056	9/27/2016 10:56	34.368272	-119.461611	9/27/2016 10:58	34.371655	-119.458266

032_1100	9/27/2016 11:00	34.374386	-119.462157	9/27/2016 11:02	34.369712	-119.463634
033_1103	9/27/2016 11:03	34.370947	-119.468379	9/27/2016 11:06	34.375583	-119.467393
034_1107	9/27/2016 11:07	34.375699	-119.472308	9/27/2016 11:10	34.371592	-119.470071
035_1111	9/27/2016 11:11	34.368448	-119.47462	9/27/2016 11:15	34.372818	-119.476847

Table 6. As-surveyed line endpoints, Rincon, Small Boat

	Start			End		
Line	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
001_0826	9/27/2016 8:26	34.284803	-119.346718	9/27/2016 8:29	34.288784	-119.341972
002_0832	9/27/2016 8:32	34.29295	-119.345466	9/27/2016 8:35	34.290146	-119.350515
003_0839	9/27/2016 8:39	34.293907	-119.353416	9/27/2016 8:42	34.297047	-119.348258
004_0845	9/27/2016 8:45	34.300473	-119.351077	9/27/2016 8:48	34.296904	-119.355929
005_0851	9/27/2016 8:51	34.299491	-119.358034	9/27/2016 8:54	34.303616	-119.353878
006_0856	9/27/2016 8:56	34.306206	-119.357784	9/27/2016 8:59	34.30171	-119.361492
007_0903	9/27/2016 9:03	34.304435	-119.366571	9/27/2016 9:06	34.308356	-119.363066
008_0909	9/27/2016 9:09	34.311864	-119.366642	9/27/2016 9:12	34.308227	-119.370395
009_0914	9/27/2016 9:14	34.310423	-119.375112	9/27/2016 9:17	34.315029	-119.370639
010_0919	9/27/2016 9:19	34.316916	-119.373543	9/27/2016 9:21	34.31239	-119.37541
011_0923	9/27/2016 9:23	34.312449	-119.373839	9/27/2016 9:26	34.317074	-119.375807
016_0935	9/27/2016 9:35	34.32593	-119.402418	9/27/2016 9:37	34.323406	-119.407022
017_0941	9/27/2016 9:41	34.325166	-119.409456	9/27/2016 9:44	34.328924	-119.405027
018_0946	9/27/2016 9:46	34.331529	-119.408787	9/27/2016 9:49	34.327612	-119.412433
019_0951	9/27/2016 9:51	34.328935	-119.416064	9/27/2016 9:53	34.3335	-119.413034
020_0956	9/27/2016 9:56	34.337697	-119.41742	9/27/2016 9:59	34.33329	-119.422165
021_1002	9/27/2016 10:02	34.336948	-119.427146	9/27/2016 10:05	34.340932	-119.422
022_1008	9/27/2016 10:08	34.344281	-119.425817	9/27/2016 10:11	34.340743	-119.430844
023_1013	9/27/2016 10:13	34.344343	-119.434462	9/27/2016 10:16	34.347438	-119.429966
024_1025	9/27/2016 10:25	34.350627	-119.432357	9/27/2016 10:28	34.347029	-119.436472
025_1029	9/27/2016 10:29	34.346184	-119.434682	9/27/2016 10:29	34.346376	-119.434647
025_1033	9/27/2016 10:33	34.345999	-119.434662	9/27/2016 10:36	34.351576	-119.434239
026_1038	9/27/2016 10:38	34.351806	-119.438407	9/27/2016 10:41	34.346729	-119.437601
027_1047	9/27/2016 10:47	34.352754	-119.453007	9/27/2016 10:50	34.356031	-119.447971
028_1052	9/27/2016 10:52	34.359249	-119.451244	9/27/2016 10:54	34.356239	-119.456027
029_1057	9/27/2016 10:57	34.359968	-119.459717	9/27/2016 10:59	34.36302	-119.454582
030_1101	9/27/2016 11:01	34.366294	-119.457225	9/27/2016 11:03	34.362542	-119.4618
031_1106	9/27/2016 11:06	34.365398	-119.464916	9/27/2016 11:08	34.369024	-119.46104
032_1110	9/27/2016 11:10	34.370671	-119.463274	9/27/2016 11:13	34.365211	-119.464912
033_1114	9/27/2016 11:14	34.366625	-119.469497	9/27/2016 11:17	34.371967	-119.468243
034_1119	9/27/2016 11:19	34.372245	-119.470181	9/27/2016 11:19	34.372131	-119.469435
034_1122	9/27/2016 11:22	34.372546	-119.470628	9/27/2016 11:24	34.367854	-119.467768
035_1126	9/27/2016 11:26	34.364655	-119.473099	9/27/2016 11:30	34.370152	-119.47564

Table 7. As-surveyed line endpoints, Ventura, PWC

	Start			End		
Line	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
001_0736	9/26/2016 7:36	34.196949	-119.249754	9/26/2016 7:39	34.195671	-119.254047
002_0742	9/26/2016 7:42	34.203567	-119.259904	9/26/2016 7:45	34.20561	-119.253892
003_0747	9/26/2016 7:47	34.213383	-119.25888	9/26/2016 7:51	34.211562	-119.264909
004_0753	9/26/2016 7:53	34.215594	-119.267622	9/26/2016 7:56	34.218019	-119.260208
005_0759	9/26/2016 7:59	34.222056	-119.263064	9/26/2016 8:02	34.220414	-119.269029
006_0804	9/26/2016 8:04	34.224434	-119.271405	9/26/2016 8:09	34.22679	-119.263834
007_0810	9/26/2016 8:10	34.228119	-119.264627	9/26/2016 8:14	34.226498	-119.271333
008_0815	9/26/2016 8:15	34.228586	-119.272816	9/26/2016 8:19	34.2304	-119.265007
009_0820	9/26/2016 8:20	34.232041	-119.266044	9/26/2016 8:24	34.231037	-119.273148
010_0825	9/26/2016 8:25	34.233043	-119.274658	9/26/2016 8:30	34.233886	-119.266365
011_0831	9/26/2016 8:31	34.235611	-119.267258	9/26/2016 8:36	34.235234	-119.274598
012_0837	9/26/2016 8:37	34.23695	-119.275261	9/26/2016 8:41	34.237487	-119.267391
046_0843	9/26/2016 8:43	34.238489	-119.269181	9/26/2016 8:51	34.223915	-119.26448
047_0852	9/26/2016 8:52	34.223377	-119.266408	9/26/2016 8:59	34.237894	-119.271393
013_0901	9/26/2016 9:01	34.239043	-119.267951	9/26/2016 9:05	34.238899	-119.275319
014_0906	9/26/2016 9:06	34.24092	-119.276184	9/26/2016 9:10	34.241516	-119.268129
015_0912	9/26/2016 9:12	34.2443	-119.26845	9/26/2016 9:16	34.24403	-119.275839
016_0918	9/26/2016 9:18	34.251167	-119.275087	9/26/2016 9:21	34.251997	-119.269581
017_0923	9/26/2016 9:23	34.255633	-119.271854	9/26/2016 9:26	34.254859	-119.276689
018_0927	9/26/2016 9:27	34.258113	-119.27891	9/26/2016 9:30	34.259877	-119.273885
019_0933	9/26/2016 9:33	34.263656	-119.277214	9/26/2016 9:36	34.262019	-119.281242
020_0937	9/26/2016 9:37	34.264341	-119.283685	9/26/2016 9:40	34.267056	-119.279593
021_0942	9/26/2016 9:42	34.269816	-119.282933	9/26/2016 9:45	34.266863	-119.286385
022_0946	9/26/2016 9:46	34.269528	-119.289922	9/26/2016 9:49	34.273073	-119.287154
023_0954	9/26/2016 9:54	34.271154	-119.294379	9/26/2016 9:57	34.274914	-119.292088
024_0959	9/26/2016 9:59	34.274093	-119.295793	9/26/2016 10:01	34.270578	-119.294718
025_1003	9/26/2016 10:03	34.269498	-119.297419	9/26/2016 10:05	34.273439	-119.298551
026_1006	9/26/2016 10:06	34.273499	-119.300492	9/26/2016 10:09	34.269189	-119.300447
027_1010	9/26/2016 10:10	34.268957	-119.302656	9/26/2016 10:12	34.27305	-119.303021
028_1014	9/26/2016 10:14	34.272433	-119.305437	9/26/2016 10:17	34.268412	-119.306006
028_1017	9/26/2016 10:17	34.268405	-119.306008	9/26/2016 10:17	34.268391	-119.306013
029_1018	9/26/2016 10:18	34.268991	-119.308146	9/26/2016 10:20	34.273159	-119.306531
030_1021	9/26/2016 10:21	34.27304	-119.307459	9/26/2016 10:24	34.269472	-119.309501
031_1024	9/26/2016 10:24	34.269661	-119.310495	9/26/2016 10:27	34.273884	-119.308842
032_1027	9/26/2016 10:27	34.274125	-119.309296	9/26/2016 10:33	34.273738	-119.310695
032_1034	9/26/2016 10:33	34.274007	-119.309562	9/26/2016 10:36	34.270472	-119.311538
033_1037	9/26/2016 10:37	34.27099	-119.313222	9/26/2016 10:40	34.274904	-119.31066
040_1042	9/26/2016 10:42	34.275888	-119.313878	9/26/2016 10:49	34.270498	-119.301222

041_1050	9/26/2016 10:50	34.269601	-119.301213	9/26/2016 10:57	34.275026	-119.314376
042_1057	9/26/2016 10:57	34.274446	-119.315226	9/26/2016 11:03	34.268868	-119.30212
048_1111	9/26/2016 11:11	34.23743	-119.273308	9/26/2016 11:18	34.224107	-119.269055
049_1119	9/26/2016 11:19	34.223274	-119.27097	9/26/2016 11:30	34.237019	-119.275585
050_1131	9/26/2016 11:31	34.236533	-119.277691	9/26/2016 11:37	34.223219	-119.273262
026_0730	9/27/2016 7:30	34.273562	-119.300702	9/27/2016 7:32	34.27166	-119.300693
030_0735	9/27/2016 7:35	34.273562	-119.307506	9/27/2016 7:36	34.271821	-119.308473
031_0736	9/27/2016 7:36	34.271939	-119.309242	9/27/2016 7:38	34.273956	-119.308621
032_0738	9/27/2016 7:38	34.274498	-119.309465	9/27/2016 7:39	34.27308	-119.310496
033_0740	9/27/2016 7:40	34.273386	-119.311601	9/27/2016 7:41	34.275107	-119.310585
034_0743	9/27/2016 7:43	34.276206	-119.312331	9/27/2016 7:46	34.271574	-119.316671
035_0747	9/27/2016 7:47	34.272888	-119.318862	9/27/2016 7:51	34.277381	-119.314252
036_0753	9/27/2016 7:53	34.28058	-119.317905	9/27/2016 7:56	34.276925	-119.322079
037_0757	9/27/2016 7:57	34.278673	-119.324561	9/27/2016 8:00	34.283743	-119.321864
038_0801	9/27/2016 8:01	34.285612	-119.326708	9/27/2016 8:04	34.2813	-119.329093
039_0805	9/27/2016 8:05	34.283352	-119.334146	9/27/2016 8:08	34.287523	-119.331864

Table 8. As-surveyed line endpoints, Ventura, Small Boat

	Start			End		
Line	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
001_0746	9/26/2016 7:46	34.195953	-119.253481	9/26/2016 7:49	34.194312	-119.258009
002_0757	9/26/2016 7:57	34.202744	-119.262485	9/26/2016 8:00	34.204318	-119.257467
003_0803	9/26/2016 8:03	34.211988	-119.263492	9/26/2016 8:07	34.209553	-119.270647
004_0809	9/26/2016 8:09	34.213964	-119.272792	9/26/2016 8:12	34.216105	-119.266401
005_0814	9/26/2016 8:14	34.220734	-119.268109	9/26/2016 8:17	34.218852	-119.274702
006_0820	9/26/2016 8:20	34.223081	-119.276246	9/26/2016 8:22	34.224874	-119.270151
007_0824	9/26/2016 8:24	34.226727	-119.27049	9/26/2016 8:27	34.224888	-119.276975
008_0828	9/26/2016 8:28	34.227398	-119.27847	9/26/2016 8:31	34.228961	-119.271524
009_0833	9/26/2016 8:33	34.231118	-119.2726	9/26/2016 8:36	34.23003	-119.279394
010_0838	9/26/2016 8:38	34.232712	-119.280235	9/26/2016 8:41	34.233269	-119.273152
011_0842	9/26/2016 8:42	34.235299	-119.273351	9/26/2016 8:46	34.234755	-119.281331
012_0847	9/26/2016 8:47	34.236623	-119.281648	9/26/2016 8:51	34.237137	-119.274083
013_0852	9/26/2016 8:52	34.238917	-119.274758	9/26/2016 8:55	34.238509	-119.282641
014_0900	9/26/2016 9:00	34.240511	-119.283187	9/26/2016 9:03	34.241012	-119.274991
015_0914	9/26/2016 9:14	34.244237	-119.274122	9/26/2016 9:18	34.243241	-119.283228
016_0922	9/26/2016 9:22	34.25012	-119.281259	9/26/2016 9:25	34.251399	-119.273966
017_0927	9/26/2016 9:27	34.25524	-119.275367	9/26/2016 9:30	34.253862	-119.281244
018_0932	9/26/2016 9:32	34.256537	-119.283116	9/26/2016 9:34	34.25849	-119.277986
019_0937	9/26/2016 9:37	34.262569	-119.279698	9/26/2016 9:39	34.260278	-119.285805
020_0941	9/26/2016 9:41	34.262051	-119.286791	9/26/2016 9:43	34.264958	-119.282791
021_0945	9/26/2016 9:45	34.267802	-119.285334	9/26/2016 9:48	34.264114	-119.288998
022_0950	9/26/2016 9:50	34.266659	-119.292049	9/26/2016 9:52	34.270119	-119.289451
023_0955	9/26/2016 9:55	34.271993	-119.294073	9/26/2016 9:57	34.267752	-119.296576
024_1002	9/26/2016 10:02	34.266541	-119.293104	9/26/2016 10:04	34.271225	-119.294985
025_1006	9/26/2016 10:06	34.270114	-119.297885	9/26/2016 10:09	34.26574	-119.296515
026_1010	9/26/2016 10:10	34.264999	-119.299938	9/26/2016 10:13	34.269769	-119.300451
027_1016	9/26/2016 10:16	34.269766	-119.302696	9/26/2016 10:19	34.264774	-119.302299
028_1022	9/26/2016 10:22	34.264571	-119.306528	9/26/2016 10:24	34.269046	-119.305887
029_1025	9/26/2016 10:25	34.270643	-119.307505	9/26/2016 10:28	34.265283	-119.309716
030_1029	9/26/2016 10:29	34.265726	-119.311073	9/26/2016 10:32	34.270151	-119.309195
031_1033	9/26/2016 10:33	34.270431	-119.310118	9/26/2016 10:33	34.270042	-119.31048
031_1036	9/26/2016 10:36	34.26914	-119.310785	9/26/2016 10:38	34.265974	-119.312258
032_1038	9/26/2016 10:38	34.266374	-119.31338	9/26/2016 10:41	34.271587	-119.310856
032_1041	9/26/2016 10:41	34.271597	-119.310851	9/26/2016 10:42	34.272147	-119.311061
033_1042	9/26/2016 10:42	34.271787	-119.31274	9/26/2016 10:45	34.267771	-119.3156
045_1050	9/26/2016 10:50	34.271909	-119.316453	9/26/2016 10:56	34.266531	-119.303701
044_1057	9/26/2016 10:57	34.267079	-119.302525	9/26/2016 11:03	34.272535	-119.315729
043_1105	9/26/2016 11:05	34.273222	-119.315108	9/26/2016 11:11	34.267883	-119.302356

052_1124	9/26/2016 11:24	34.234561	-119.284816	9/26/2016 11:31	34.221645	-119.280305
051_1134	9/26/2016 11:34	34.221904	-119.275166	9/26/2016 11:42	34.236099	-119.27975
034_0749	9/27/2016 7:49	34.269354	-119.318474	9/27/2016 7:52	34.27312	-119.315105
035_0753	9/27/2016 7:53	34.27458	-119.317141	9/27/2016 7:56	34.271085	-119.320832
036_0758	9/27/2016 7:58	34.273917	-119.325557	9/27/2016 8:01	34.277546	-119.321412
037_0803	9/27/2016 8:03	34.279961	-119.323647	9/27/2016 8:06	34.275848	-119.326164
038_0808	9/27/2016 8:08	34.277244	-119.331138	9/27/2016 8:11	34.281875	-119.328776
039_0812	9/27/2016 8:12	34.282569	-119.329183	9/27/2016 8:14	34.28477	-119.333218
039_0814	9/27/2016 8:14	34.284558	-119.333797	9/27/2016 8:17	34.280245	-119.336148

Table 9. As-surveyed line endpoints, Mugu, PWC

	Start			End		
Line	Date/time (PST)	Lat	Lon	Date/time (PST)	Lat	Lon
072_0951	9/29/2016 9:51	34.088872	-119.090449	9/29/2016 9:57	34.098226	-119.084457
073_1002	9/29/2016 10:02	34.09975	-119.090556	9/29/2016 10:09	34.090067	-119.095865
074_1010	9/29/2016 10:10	34.091358	-119.095964	9/29/2016 10:15	34.099363	-119.095389
078_1017	9/29/2016 10:17	34.09954	-119.097412	9/29/2016 10:22	34.095365	-119.084116
075_1026	9/29/2016 10:26	34.090741	-119.095697	9/29/2016 10:33	34.098991	-119.100341
076_1034	9/29/2016 10:34	34.097503	-119.10229	9/29/2016 10:40	34.089334	-119.095315
077_1044	9/29/2016 10:44	34.084596	-119.10555	9/29/2016 10:50	34.09531	-119.107077
080_1053	9/29/2016 10:53	34.093332	-119.108433	9/29/2016 10:59	34.099505	-119.098223
079_1101	9/29/2016 11:01	34.097798	-119.10198	9/29/2016 11:08	34.098994	-119.089326

Appendix A: Weather Observation Forms

Date: 9/26/16_____ **Monitor:** __Dan Hoover_____

Time	Latitude	Longitude	Vessel Activity	Weather	Cloud Cover	Glare	Visibility	Wind Speed	Sea State	Swell Height	Comments
0800 – 1345 PDT	34.39596 to 34.42161	-119.9087 to -119.8112	surveying	clear	Clear	none	5 km	1-3 kts	Slight chop	0.5m	Observations based on general conditions throughout PWC survey. PWC operator does not have resources to make detailed weather

Date: 9/27/16_____ **Monitor:** __Dan Hoover_____

Time	Latitude	Longitude	Vessel Activity	Weather	Cloud Cover	Glare	Visibility	Wind Speed	Sea State	Swell Height	Comments
0645 – 1200 PDT	34.19431 to 34.28752	-119.3341 to -119.2498	surveying	clear	Clear	none	5 km	1-3 kts	Slight chop	0.5m	Observations based on general conditions throughout PWC survey. PWC operator does not have resources to make detailed weather

Date: 9/28/16_____ **Monitor:** __Patrick Barnard_____

Time	Latitude	Longitude	Vessel Activity	Weather	Cloud Cover	Glare	Visibility	Wind Speed	Sea State	Swell Height	Comments
0715 – 1200 PDT	34.26935 to 34.38553	-119.5095 to -119.3007	surveying	clear	Clear	none	5 km	1-3 kts	Slight chop	0.5m	Observations based on general conditions throughout PWC survey. PWC operator does not have resources to make detailed weather

Date: 9/29/16_____ **Monitor:** __ Patrick Barnard _____

Time	Latitude	Longitude	Vessel Activity	Weather	Cloud Cover	Glare	Visibility	Wind Speed	Sea State	Swell Height	Comments
0800 – 1200 PDT	34.38272 to 34.41901	-119.6790 to -119.5135	surveying	clear	Clear	none	5 km	1-3 kts	Slight chop	0.5m	Observations based on general conditions throughout PWC survey. PWC operator does not have resources to make detailed weather

Date: 9/30/16 _____ **Monitor:** __Dan Hoover_____

Time	Latitude	Longitude	Vessel Activity	Weather	Cloud Cover	Glare	Visibility	Wind Speed	Sea State	Swell Height	Comments
0900 - 1200 PDT	34.09975 to 34.08460	-119.1084 to -119.0841	surveying	clear	Clear	none	5 km	7-10 kts	Small waves	1.5m	Observations based on general conditions throughout PWC survey. PWC operator does not have resources to make detailed weather

Appendix B: Marine Wildlife Observations

Date: 9/26-30/16 _____ Monitor: Dan Hoover

No notable observations were made of marine wildlife on any of the survey days. Sea lions occasionally were noted resting at the surface, and sea otters occasionally were seen from a distance, resting in kelp, but infrequently and not in great abundance. There were no observations of whales or dolphins or unusual aggregations of seabirds.

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
Air Quality and Greenhouse Gas (GHG) Emissions (MND Section 3.3.3)						
MM AIR-1: Engine Tuning, Engine Certification, and Fuels. The following measures will be required to be implemented by all Permittees under the Offshore Geophysical Permit Program (OGPP), as applicable depending on the county offshore which a survey is being conducted. Pursuant to section 93118.5 of CARB's Airborne Toxic Control Measures, the Tier 2 engine requirement applies only to diesel-fueled vessels.	All Counties: Maintain all construction equipment in proper tune according to manufacturers' specifications; fuel all off-road and portable diesel-powered equipment with California Air Resources Board (CARB)-certified motor vehicle diesel fuel limiting sulfur content to 15 parts per million or less (CARB Diesel).	Daily emissions of criteria pollutants during survey activities are minimized.	Determine engine certification of vessel engines. Review engine emissions data to assess compliance, determine if changes in tuning or fuel are required.	OGPP permit holder and contract vessel operator; California State Lands Commission (CSLC) review of Final Monitoring Report.	Prior to, during, and after survey activities. Submit Final Monitoring Report after completion of survey activities.	N/A (GAS ENGINES)
	Los Angeles and Orange Counties: Use vessel engines meeting CARB's Tier 2-certified engines or cleaner; the survey shall be operated such that daily NO_x emissions do not exceed 100 pounds based on engine certification emission factors. This can be accomplished with Tier 2 engines if daily fuel use is 585 gallons or less, and with Tier 3 engines if daily fuel use is 935 gallons or less.		Verify that Tier 2 or cleaner engines are being used. Calculate daily NO_x emissions to verify compliance with limitations.			
	San Luis Obispo County: Use vessel engines meeting CARB's Tier 2-certified engines or cleaner, accomplished with Tier 2 engines if daily fuel use is 585 gallons or less; all diesel equipment shall not idle for more than 5 minutes; engine use needed to maintain position in the water is not considered idling; diesel idling within 300 meters (1,000 feet) of sensitive receptors is not permitted; use alternatively fueled construction equipment on site where feasible, such as compressed natural gas, liquefied natural gas, propane or biodiesel.		Verify that Tier 2 or cleaner engines are being used. Inform vessel operator(s) of idling limitation. Investigate availability of alternative fuels.			
	Santa Barbara County: Use vessel engines meeting CARB's Tier 2-certified engines or cleaner, accomplished with Tier 2 engines if daily fuel use is 790 gallons or less.		Verify that Tier 2 or cleaner engines are being used. Investigate availability of alternative fuels.			
	Ventura County: Use alternatively fueled construction equipment on site where feasible, such as compressed natural gas, liquefied natural gas, propane or biodiesel.		Investigate availability of alternative fuels.			

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-1: Marine Mammal and Sea Turtle Presence – Current Information.	All State waters; prior to commencement of survey operations, the geophysical operator shall: (1) contact the National Oceanic and Atmospheric Administration Long Beach office staff and local whale-watching operations and shall acquire information on the current composition and relative abundance of marine wildlife offshore, and (2) convey sightings data to the vessel operator and crew, survey party chief, and onboard Marine Wildlife Monitors (MWMs) prior to departure. This information will aid the MWMs by providing data on the approximate number and types of organisms that may be in the area.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Document contact with appropriate sources. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder; Inquiry to NOAA and local whale watching operators.	Prior to survey.	8/22/16
MM BIO-2: Marine Wildlife Monitors (MWMs).	Except as provided in section 7(h) of the General Permit, a minimum of two (2) qualified MWMs who are experienced in marine wildlife observations shall be onboard the survey vessel throughout both transit and data collection activities. The specific monitoring, observation, and data collection responsibilities shall be identified in the Marine Wildlife Contingency Plan required as part of all Offshore Geophysical Permit Program permits. Qualifications of proposed MWMs shall be submitted to the National Oceanic and Atmospheric Administration (NOAA) and CSLC at least twenty-one (21) days in advance of the survey for their approval by the agencies. Survey operations shall not commence until the CSLC approves the MWMs.	Competent and professional monitoring or marine mammals and sea turtles; compliance with established monitoring policies.	Document contact with and approval by appropriate agencies. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	8/22/16
MM BIO-3: Safety Zone Monitoring.	Onboard Marine Wildlife Monitors (MWMs) responsible for observations during vessel transit shall be responsible for monitoring during the survey equipment operations. All visual monitoring shall occur from the highest practical vantage point aboard the survey vessel; binoculars shall be used to observe the surrounding area, as appropriate. The MWMs will survey an area (i.e., safety or exclusion zone) based on the equipment used, centered on the sound source (i.e., vessel, towfish), throughout time that the survey equipment is operating. Safety zone radial distances, by equipment type, include:	No adverse effects to marine mammals or sea turtles due to survey activities are observed; compliance with established safety zones.	Compliance with permit requirements (observers); compliance with established safety zones. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	8/22/16

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
	<table><tr><th>Equipment Type</th><th>Safety Zone (radius, m)</th></tr><tr><td>Single Beam Echosounder</td><td>50</td></tr><tr><td>Multibeam Echosounder</td><td>500</td></tr><tr><td>Side-Scan Sonar</td><td>600</td></tr><tr><td>Subbottom Profiler</td><td>100</td></tr><tr><td>Boomer System</td><td>100</td></tr></table> If the geophysical survey equipment is operated at or above a frequency of 200 kilohertz (kHz), safety zone monitoring and enforcement is not required; however, if geophysical survey equipment operated at a frequency at or above 200 kHz is used simultaneously with geophysical survey equipment less than 200 kHz, then the safety zone for the equipment less than 200 kHz must be monitored. The onboard MWMs shall have authority to stop operations if a mammal or turtle is observed within the specified safety zone and may be negatively affected by survey activities. The MWMs shall also have authority to recommend continuation (or cessation) of operations during periods of limited visibility (i.e., fog, rain) based on the observed abundance of marine wildlife. Periodic reevaluation of weather conditions and reassessment of the continuation/cessation recommendation shall be completed by the onboard MWMs. During operations, if an animal's actions are observed to be irregular, the monitor shall have authority to recommend that equipment be shut down until the animal moves further away from the sound source. If irregular behavior is observed, the equipment shall be shut-off and will be restarted and ramped-up to full power, as applicable, or will not be started until the animal(s) is/are outside of the safety zone or have not been observed for 15 minutes. For nearshore survey operations utilizing vessels that lack the personnel capacity to hold two (2) MWMs aboard during survey operations, at least twenty-one (21) days prior to the commencement of survey activities, the Permittee may petition the CSLC to conduct survey operations with one (1) MWM aboard. The CSLC will consider such authorization on a case-by-case basis and					8/22/16

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
	factors the CSLC will consider will include the timing, type, and location of the survey, the size of the vessel, and the availability of alternate vessels for conducting the proposed survey. CSLC authorizations under this subsection will be limited to individual surveys and under any such authorization; the Permittee shall update the MWCP to reflect how survey operations will occur under the authorization.					
MM BIO-4: Limits on Nighttime OGPP Surveys.	All State waters; nighttime survey operations are prohibited under the OGPP, except as provided below. The CSLC will consider the use of single beam echosounders and passive equipment types at night on a case-by-case basis, taking into consideration the equipment specifications, location, timing, and duration of survey activity.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Presurvey request for nighttime operations, including equipment specifications and proposed use schedule. Document equipment use. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Approval required before survey is initiated. Monitoring Report following comple-tion of survey.	8/22/16
MM BIO-5: Soft Start.	All State waters; the survey operator shall use a "soft start" technique at the beginning of survey activities each day (or following a shut down) to allow any marine mammal that may be in the immediate area to leave before the sound sources reach full energy. Surveys shall not commence at nighttime or when the safety zone cannot be effectively monitored. Operators shall initiate each piece of equipment at the lowest practical sound level, increasing output in such a manner as to increase in steps not exceeding approximately 6 decibels (dB) per 5-minute period. During ramp-up, the Marine Wildlife Monitors (MWMs) shall monitor the safety zone. If marine mammals are sighted within or about to enter the safety zone, a power-down or shut down shall be implemented as though the equipment was operating at full power. Initiation of ramp-up procedures from shut down requires that the MWMs be able to visually observe the full safety zone.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Compliance with permit requirements (observers); compliance with safe start procedures. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Imme-diately prior to survey.	9/26/16

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-6: Practical Limitations on Equipment Use and Adherence to Equipment Manufacturer's Routine Maintenance Schedule.	All State waters; geophysical operators shall follow, to the maximum extent possible, the guidelines of Zykov (2013) as they pertain to the use of subbottom profilers and side-scan sonar, including: • Using the highest frequency band possible for the subbottom profiler; • Using the shortest possible pulse length; and • Lowering the pulse rate (pings per second) as much as feasible. Geophysical operators shall consider the potential applicability of these measures to other equipment types (e.g., boomer). Permit holders will conduct routine inspection and maintenance of acoustic-generating equipment to ensure that low energy geophysical equipment used during permitted survey activities remains in proper working order and within manufacturer's equipment specifications. Verification of the date and occurrence of such equipment inspection and maintenance shall be provided in the required presurvey notification to CSLC.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Document initial and during survey equipment settings. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Imme-diately prior to and during survey.	9/26/16
MM BIO-7: Avoidance of Pinniped Haul-Out Sites.	The Marine Wildlife Contingency Plan (MWCP) developed and implemented for each survey shall include identification of haul-out sites within or immediately adjacent to the proposed survey area. For surveys within 300 meters (m) of a haul-out site, the MWCP shall further require that: • The survey vessel shall not approach within 91 m of a haul-out site, consistent with National Marine Fisheries Service (NMFS) guidelines; • Survey activity close to haul-out sites shall be conducted in an expedited manner to minimize the potential for disturbance of pinnipeds on land; and • Marine Wildlife Monitors shall monitor pinniped activity onshore as the vessel approaches, observing and reporting on the number of pinnipeds potentially disturbed (e.g., via head lifting, flushing into the water). The purpose of such reporting is to provide CSLC and California Department of Fish and Wildlife (CDFW) with information regarding potential disturbance associated with OGPP surveys.	No adverse effects to pinnipeds at haul outs are observed.	Document pinniped reactions to vessel presence and equipment use. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Monitoring Report following comple-tion of survey.	9/30/16

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-8: Reporting Requirements – Collision.	All State waters; if a collision with marine mammal or reptile occurs, the vessel operator shall document the conditions under which the accident occurred, including the following: • Vessel location (latitude, longitude) when the collision occurred; • Date and time of collision; • Speed and heading of the vessel at the time of collision; • Observation conditions (e.g., wind speed and direction, swell height, visibility in miles or kilometers, and presence of rain or fog) at the time of collision; • Species of marine wildlife contacted (if known); • Whether an observer was monitoring marine wildlife at the time of collision; and, • Name of vessel, vessel owner/operator, and captain officer in charge of the vessel at time of collision. After a collision, the vessel shall stop, if safe to do so; however, the vessel is not obligated to stand by and may proceed after confirming that it will not further damage the animal by doing so. The vessel will then immediately communicate by radio or telephone all details to the vessel's base of operations, and shall immediately report the incident. Consistent with Marine Mammal Protection Act requirements, the vessel's base of operations or, if an onboard telephone is available, the vessel captain him/herself, will then immediately call the National Oceanic and Atmospheric Administration (NOAA) Stranding Coordinator to report the collision and follow any subsequent instructions. From the report, the Stranding Coordinator will coordinate subsequent action, including enlisting the aid of marine mammal rescue organizations, if appropriate. From the vessel's base of operations, a telephone call will be placed to the Stranding Coordinator, NOAA National Marine Fisheries Service (NMFS), Southwest Region, Long Beach, to obtain instructions. Although NOAA has primary responsibility for marine mammals in both State and Federal waters, the California Department of Fish and Wildlife (CDFW) will also be advised that an incident has occurred in State waters affecting a protected species.	No adverse effects to marine mammals or sea turtles due to survey activities are observed.	Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Monitoring Report following comple-tion of survey.	9/30/14

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM BIO-9: Limitations on Survey Operations in Select Marine Protected Areas (MPAs).	All MPAs; prior to commencing survey activities, geophysical operators shall coordinate with the CLSC, California Department of Fish and Wildlife (CDFW), and any other appropriate permitting agency regarding proposed operations within MPAs. The scope and purpose of each survey proposed within a MPA shall be defined by the permit holder, and the applicability of the survey to the allowable MPA activities shall be delineated by the permit holder. If deemed necessary by CDFW, geophysical operators will pursue a scientific collecting permit, or other appropriate authorization, to secure approval to work within a MPA, and shall provide a copy of such authorization to the CSLC as part of the required presurvey notification to CSLC. CSLC, CDFW, and/or other permitting agencies may impose further restrictions on survey activities as conditions of approval.	No adverse effects to MPA resources due to survey activities are observed.	Monitor reactions of wildlife to survey operations; report on shutdown conditions and survey restart. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder; survey permitted by CDFW.	Prior to survey.	8/22/16
MM HAZ-1: Oil Spill Contingency Plan (OSCP) Required Information.	Permittees shall develop and submit to CSLC staff for review and approval an OSCP that addresses accidental releases of petroleum and/or non-petroleum products during survey operations. Permittees' OSCPs shall include the following information for each vessel to be involved with the survey: • Specific steps to be taken in the event of a spill, including notification names, phone numbers, and locations of: (1) nearby emergency medical facilities, and (2) wildlife rescue/response organizations (e.g., Oiled Wildlife Care Network); • Description of crew training and equipment testing procedures; and • Description, quantities, and location of spill response equipment onboard the vessel.	Reduction in the potential for an accidental spill. Proper and timely response and notification of responsible parties in the event of a spill.	Documentation of proper spill training. Notification of responsible parties in the event of a spill.	OGPP permit holder and contract vessel operator.	Prior to survey.	8/22/16
MM HAZ-2: Vessel fueling restrictions.	Vessel fueling shall only occur at an approved docking facility. No cross vessel fueling shall be allowed.	Reduction in the potential for an accidental spill.	Documentation of fueling activities.	Contract vessel operator.	Following survey.	9/30/16
MM HAZ-3: OSCP equipment and supplies.	Onboard spill response equipment and supplies shall be sufficient to contain and recover the worst-case scenario spill of petroleum products as outlined in the OSCP.	Proper and timely response in the event of a spill.	Notification to CSLC of onboard spill response equipment/supplies inventory, verify	Contract vessel operator.	Prior to survey.	8/22/16

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
			ability to respond to worst-case spill.			
MM HAZ-1: Oil Spill Contingency Plan (OSCP) Required Information.	Outlined under **Hazards and Hazardous Materials** (above)					
MM HAZ-2: Vessel fueling restrictions.	Outlined under **Hazards and Hazardous Materials** (above)					
MM HAZ-3: OSCP equipment and supplies.	Outlined under **Hazards and Hazardous Materials** (above)					
MM BIO-9: Limitations on Survey Operations in Select MPAs.	Outlined under **Biological Resources** (above)					
MM REC-1: U.S. Coast Guard (USCG), Harbormaster, and Dive Shop Operator Notification.	All California waters where recreational diving may occur; as a survey permit condition, the CSLC shall require Permittees to provide the USCG with survey details, including information on vessel types, survey locations, times, contact information, and other details of activities that may pose a hazard to divers so that USCG can include the information in the Local Notice to Mariners, advising vessels to avoid potential hazards near survey areas. Furthermore, at least twenty-one (21) days in advance of in-water activities, Permittees shall: (1) post such notices in the harbormasters' offices of regional harbors; and (2) notify operators of dive shops in coastal locations adjacent to the proposed offshore survey operations.	No adverse effects to recreational divers from survey operations.	Notify the USCG, local harbormasters, and local dive shops of planned survey activity. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	8/22/16

Mitigation Measure (MM)	Location and Scope of Mitigation	Effectiveness Criteria	Monitoring or Reporting Action	Responsible Party	Timing	Implementation Date(s) and Initials
MM FISH-1: U.S. Coast Guard (USCG) and Harbormaster Notification.	All California waters; as a survey permit condition, the CSLC shall require Permittees to provide the USCG with survey details, including information on vessel types, survey locations, times, contact information, and other details of activities that may pose a hazard to mariners and fishers so that USCG can include the information in the Local Notice to Mariners, advising vessels to avoid potential hazards near survey areas. Furthermore, at least twenty-one (21) days in advance of in-water activities, Permittees shall post such notices in the harbormasters' offices of regional harbors.	No adverse effects to commercial fishing gear in place.	Notify the USCG and local harbormasters of planned survey activity. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Prior to survey.	8/22/16
MM FISH-2: Minimize Interaction with Fishing Gear.	To minimize interaction with fishing gear that may be present within a survey area: (1) the geophysical vessel (or designated vessel) shall traverse the proposed survey corridor prior to commencing survey operations to note and record the presence, type, and location of deployed fishing gear (i.e., buoys); (2) no survey lines within 30 m (100 feet) of observed fishing gear shall be conducted. The survey crew shall not remove or relocate any fishing gear; removal or relocation shall only be accomplished by the owner of the gear upon notification by the survey operator of the potential conflict.	No adverse effects to commercial fishing gear in place.	Visually observe the survey area for commercial fishing gear. Notify the gear owner and request relocation of gear outside survey area. Submit Final Monitoring Report after completion of survey activities.	OGPP permit holder.	Imme-diately prior to survey (prior to each survey day).	9/26/16
MM FISH-1: USCG and Harbormaster Notification.	Outlined under **Commercial and Recreational Fisheries** (above)					

Acronyms/Abbreviations: CARB = California Air Resources Board; CDFW = California Department of Fish and Wildlife; CSLC = California State Lands Commission; dB = decibels; kHz = kilohertz; MPA = Marine Protected Area; MWCP = Marine Wildlife Contingency Plan; MWM = Marine Wildlife Monitor; m= meter(s); NOAA = National Oceanic and Atmospheric Administration; NO_x = Nitrogen Oxide; OGPP = Offshore Geophysical Permit Program; OSCP = Oil Spill Contingency Plan; USCG = U.S. Coast Guard